Form # P 04

DISPLAY THIS CARD ON PRINCIPAL FRONTAGE OF WORK
CITY OF PORTLAND
BUILDING INSPECTION
PERMIT

Permit Number: 031195

This is to certify that ___ Promenade East/TBD Construction ___

has permission to ___ Install 3 Antennas & Base Station Equipment for ___ Network ___

AT ___ 320 Eastern Promenade ___ 015 A002001 ___

provided that the person or persons, firm or corporation accepting this permit shall comply with all of the provisions of the Statutes of Maine and of the Ordinances of the City of Portland regulating the construction, maintenance and use of buildings and structures, and of the application on file in this department.

Apply to Public Works for street line and grade if nature of work requires such information.

Notification of inspection must be given and written permission procured before this building or part thereof is lathed or otherwise closed-in. 48 HOUR NOTICE IS REQUIRED.

A certificate of occupancy must be procured by owner before this building or part thereof is occupied.

OTHER REQUIRED APPROVALS

Fire Dept. _____

Health Dept. _____

Appeal Board _____

Other _____
Department Name

Director - Building & Inspection Services

10/17/03

PENALTY FOR REMOVING THIS CARD

City of Portland, Maine - Building or Use Permit

389 Congress Street, 04101 Tel: (207) 874-8703, Fax: (207) 874-8716

Permit No:	Date Applied For:	CBL:
03-1195	09/29/2003	015 A002001

Location of Construction:	Owner Name:	Owner Address:	Phone:
320 Eastern Promenade	Promenade East	320 Eastern Promenade	( ) 773-5531

Business Name:	Contractor Name:	Contractor Address:	Phone
	TBD Construction	Westview Drive Sanford	(207) 651-0408

Lessee/Buyer's Name	Phone:		Permit Type:
			Additions - Multi Family

Proposed Use:	Proposed Project Description:
Multi Family High Rise/80 Units-Promenade East w/3 antennae & base station for PCS network	Install 3 Antennas & Base Station Equipment for PCS Network

Dept:	Zoning	Status:	Approved	Reviewer:	Marge Schmuckal	Approval Date:	10/03/2003
Note:	C of O on file for the 80 D.U.					Ok to Issue:	☑

Dept:	Building	Status:	Pending	Reviewer:	Mike Nugent	Approval Date:	
Note:						Ok to Issue:	☐

Dept:	Fire	Status:	Approved	Reviewer:	Lt. MacDougal	Approval Date:	10/06/2003
Note:						Ok to Issue:	☑

Comments:

10/14/2003-mjn: Guard design? Roof laods, Special inspections

OEST Associates, Inc.

October 14, 2003

City of Portland
Michael Nugent
389 Congress Street
Portland Maine04101

SUBJECT: Portland Maine Wireless Communications Projects

Dear Michael:

This letter will hopefully clear up any questions that you raised in a phone conversation with me on 14 October 2003.

Promenade East

1. The answer to the question that you raised about the railing configuration around the platform as shown on our drawings is Use group U. This allows the railing to be as shown. The whole equipment platform is enclosed in a locked wood fence compound.

2. The analysis of the existing roof for capacity is shown in the calculation package as submitted on pages 2 thru 5.
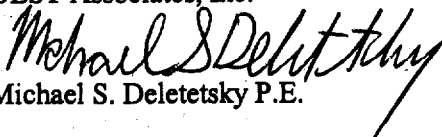
Doubletree Hotel

1. The analysis of the existing penthouse for capacity is shown in the calculation package as submitted on pages 4 and 5.

Deering Pavilion

1. The analysis of the existing roof for capacity is shown in the calculation package as submitted on pages 5 and 10(Concrete Wall Design (ACI 381-99)).

The work for the field welds shall be visually inspected by an AWS Certified Weld Inspector prior to welding for all the projects that are submitted for your review. If you have any questions please feel free to call me.

Sincerely,
OEST Associates, Inc.

Michael S. Deletetsky P.E.

MSD:lam
M:\390 LCC, International\City of Portland101403.doc

City of Portland, Maine - Building or Use Permit Application
389 Congress Street, 04101 Tel: (207) 874-8703, Fax: (207) 874-8716

Permit No:	Issue Date:	CBL:
03-1195		015 A002001

Location of Construction:	Owner Name:	Owner Address:	Phone:
320 Eastern Promenade	Promenade East	320 Eastern Promenade	773-5531

Business Name:	Contractor Name:	Contractor Address:	Phone
	TBD Construction	Westview Drive Sanford	2076510408

Lessee/Buyer's Name	Phone:	Permit Type:	Zone:
		Additions - Multi Family	RG

Past Use:	Proposed Use:	Permit Fee:	Cost of Work:	CEO District:
Multi Family High Rise/80 Units- Promenade East	Multi Family High Rise/80 Units- Promenade East	$516.00	$55,000.00	1

Local use, 80 D.U.

FIRE DEPT: ☑ Approved ☐ Denied

INSPECTION: Use Group: U Type: 2A

Signature:

Proposed Project Description:
Install 3 Antennas & Base Station Equipment for PCS Network

Signature:

PEDESTRIAN ACTIVITIES DISTRICT (P.A.D.)

Action: ☐ Approved ☐ Approved w/Conditions ☐ Denied

Signature: Date:

Permit Taken By:	Date Applied For:
gad	09/29/2003

Zoning Approval

1. This permit application does not preclude the Applicant(s) from meeting applicable State and Federal Rules.

2. Building permits do not include plumbing, septic or electrical work.

3. Building permits are void if work is not started within six (6) months of the date of issuance. False information may invalidate a building permit and stop all work..

Special Zone or Reviews
- ☐ Shoreland
- ☐ Wetland
- ☐ Flood Zone
- ☐ Subdivision
- ☒ Site Plan exempt Attached & signed
  Maj ☐ Minor ☐ MM ☐
  Date: 10/3/03

Zoning Appeal
- ☐ Variance
- ☐ Miscellaneous
- ☐ Conditional Use
- ☐ Interpretation
- ☐ Approved
- ☐ Denied

Date:

Historic Preservation
- ☑ Not in District or Landmark
- ☐ Does Not Require Review
- ☐ Requires Review
- ☐ Approved
- ☐ Approved w/Conditions
- ☐ Denied

Date:

CERTIFICATION

I hereby certify that I am the owner of record of the named property, or that the proposed work is authorized by the owner of record and that I have been authorized by the owner to make this application as his authorized agent and I agree to conform to all applicable laws of this jurisdiction. In addition, if a permit for work described in the application is issued, I certify that the code official's authorized representative shall have the authority to enter all areas covered by such permit at any reasonable hour to enforce the provision of the code(s) applicable to such permit.

SIGNATURE OF APPLICANT	ADDRESS	DATE	PHONE

RESPONSIBLE PERSON IN CHARGE OF WORK, TITLE		DATE	PHONE

031195

All Purpose Building Permit Application

If you or the property owner owes real estate or personal property taxes or user charges on any property within the City, payment arrangements must be made before permits of any kind are accepted.

320

| Location/Address of Construction: 340 Promenade East |

| Total Square Footage of Proposed Structure 200 sq ft | Square Footage of Lot Leasing 200 sq ft |

| Tax Assessor's Chart, Block & Lot Chart# 15 Block# A00 Lot# 2 | Owner: Promenade East Condo Assoc. | Telephone: 773-5531 |

| Lessee/Buyer's Name (If Applicable) United States Cellular | Applicant name, address & telephone: U.S. Cellular, 482 Congress Street, Portland, Me 04103 | Cost Of Work: $ 55,000 Fee: $ 516.00 |

Current use: Condominiums

If the location is currently vacant, what was prior use: _____

Will bring lease in office

Approximately how long has it been vacant: _____

Proposed use: Installation of 3 Antennas + Base Station Equipment
Project description:

Contractor's name, address & telephone: TBD

Who should we contact when the permit is ready: Ed Shaw

Mailing address:

We will contact you by phone when the permit is ready. You must come in and pick up the permit and review the requirements before starting any work, with a Plan Reviewer. A stop work order will be issued and a $100.00 fee if any work starts before the permit is picked up. **PHONE:** 771-9992 cell

IF THE REQUIRED INFORMATION IS NOT INCLUDED IN THE SUBMISSIONS THE PERMIT WILL BE AUTOMATICALLY DENIED AT THE DISCRETION OF THE BUILDING/PLANNING DEPARTMENT, WE MAY REQUIRE ADDITIONAL INFORMATION IN ORDER TO APROVE THIS PERMIT.

I hereby certify that I am the Owner of record of the named property, or that the owner of record authorizes the proposed work and that I have been authorized by the owner to make this application as his/her authorized agent. I agree to conform to all applicable laws of this jurisdiction. In addition, if a permit for work described in this application is issued, I certify that the Code Official's authorized representative shall have the authority to enter all areas covered by this permit at any reasonable hour to enforce the provisions of the codes applicable to this permit.

| Signature of applicant: Edward A Shaw | Date: 9/15/03 |

This is NOT a permit, you may not commence ANY work until the permit is issued.
If you are in a Historic District you may be subject to additional permitting and fees with the Planning Department on the 4th floor of City Hall

years
1983 - 2003

September 15, 2003

Building Department
389 Congress Street
Portland, Me 04101

To Whom It May Concern:

United States Cellular Corporation (USCC) received a License authorizing them to provide service in Cumberland County. USCC has since hired LCC International to accomplish that objective. LCC is currently locating, leasing, and receiving zoning approvals and acquiring building permits for several approved locations in Portland.

Promenade East Condominium Association has been chosen as one of the approved locations. USCC is proposing to place (3) three cellular antennas on top of the building located at 340 Promenade East in Portland, Maine. The Antennas and Base Station Equipment will be located as shown on the attached drawing.

USCC has already received an Exemption from Site Plan Review and would now like to receive a building permit to do the work as proposed.
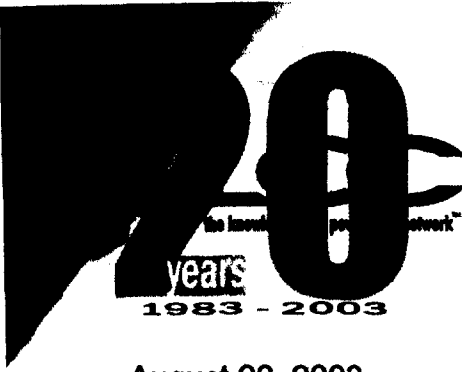
We would appreciate consideration at the earliest possible date. In addition, I would appreciate it if you, or someone on your staff, would contact me if any additional material or information is required at this stage of the process.

Thank you for your consideration of this application.

Respectfully submitted,

Edward A. Shaw
LCC International Inc.
482 Congress Street
Suite 502
Portland, ME 04101

LCC International, Inc.
482 Congress Street
Portland, ME 04101
(207) 771-9992 (Office)
(207) 771-9993 (Fax)

August 26, 2003

Lease is forthcoming
ok'd By Marge.
Ed Shaw

Promenade East Condominiums
340 Eastern Promenade
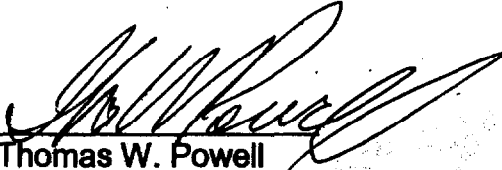Portland, ME 04101

Re: Site # 853332.1
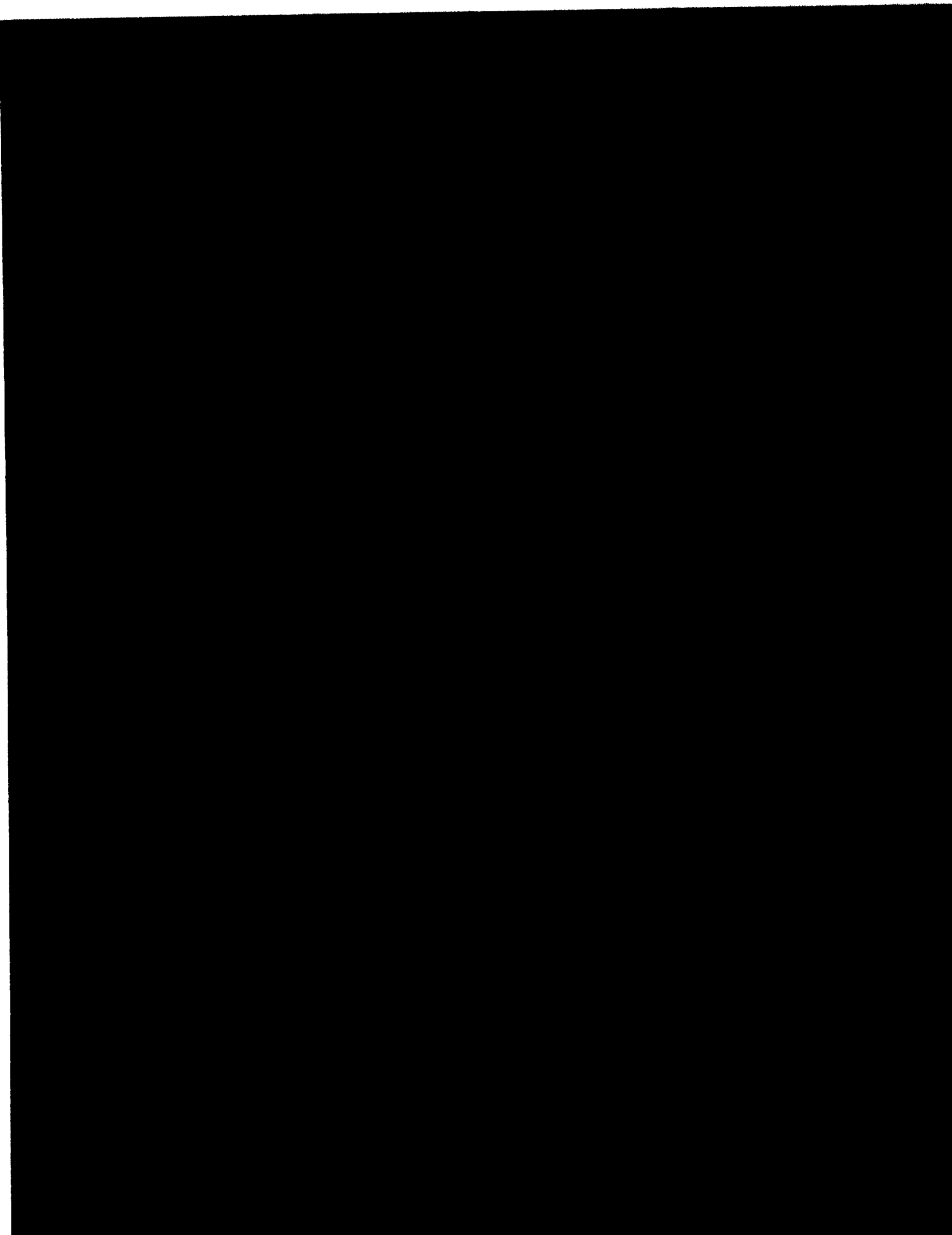
Dear Pauline R. Daniels,

LCC has been contracted by US Cellular to design, develop and deploy their new PCS network in York, Cumberland and Sagadahoc Counties. As part of LCC's scope of work, we negotiate leases on behalf of our client, to secure space to construct repeater sites. When we reach a point in lease negotiations where both parties (land owner and US Cellular) are in agreement on lease terms and language, we initiate the building permit process to determine if and when the lease will commence.

At this time we are in good faith negotiations with you and feel we will consummate our deal on your property in a relatively short period. We would like to request your permission to apply for all regulatory approvals required (including, but not limited to; zoning permit, building permit, FAA and FCC filings) to build our repeater site on your property. By granting your approval, you are not contractually binding yourself to any lease contract that has not been fully executed to date. Please signify your consent to grant LCC permission to file for necessary permits for constructing a repeater site on your property by signing below.

Thank You,


Thomas W. Powell
Program Manager
LCCI, Inc.

Pauline R. Daniels
Office Administrator / Officer
Promenade East Condominiums

853332.1
PROMANADE EAST
Roof
Plan

(2) Sprint antennas

USCC Antenna

10'   Proposed Leased Area on Ground   20'   10'x20'

(3) T-Mobil antennas

KEY PLAN

BASEMENT PLAN
SCALE 1/8" = 1'-0"

ROOF PLAN
SCALE 1/8" = 1'-0"

USCC Antenna

USCC Antenna

(2) Sprint antennas

USCC Antenna

(2) Sprint antennas

EASTERN PROMENADE CONDOMINIUMS
Portland, Maine

CELLULAR TELEPHONE ANTENNA SUPPORT
STRUCTURAL CALCULATIONS

SUBMITTAL #1

9-23-03
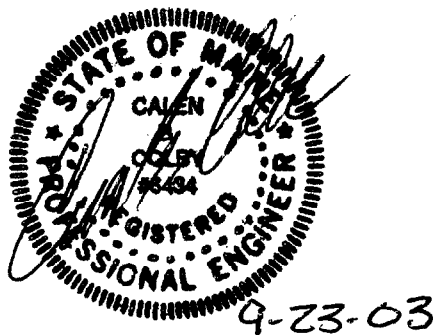
Prepared for:

LCC International, Inc.
482 Congress Street, Suite 502
Portland, ME 04101

Prepared by:

OEST Associates, Inc.
343 Gorham Rd.
South Portland, ME 04106-2317

September 22, 2003

LCC International
482 Congress Street
Suite 502
Portland, ME 04101
(207) 771-9992 (Office)
(207) 771-9993 (Fax)

October 3, 2003

Building Department
389 Congress Street
Portland, Me 04101

To Whom It May Concern:

United States Cellular Corporation (USCC) received a License authorizing them to provide service in Cumberland County. USCC has since hired LCC International to accomplish that objective. LCC is currently locating, leasing, and receiving zoning approvals and acquiring building permits for several approved locations in Portland.

Doubletree Hotel has been chosen as one of the approved locations. USCC is proposing to place (6) six cellular antennas on top of a twenty-foot Monopole placed on the roof of the building located at 1230 Congress Street in Portland, Maine. The Antennas and Base Station Equipment will be located as shown on the attached drawing.

USCC has already received an Exemption from Site Plan Review and would now like to receive a building permit to do the work as proposed.

We would appreciate consideration at the earliest possible date. In addition, I would appreciate it if you, or someone on your staff, would contact me if any additional material or information is required at this stage of the process.

Thank you for your consideration of this application.

Respectfully submitted,

Edward A. Shaw
LCC International Inc.
482 Congress Street
Suite 502
Portland, ME 04101

OEST ASSOCIATES, INC.

PREPARED BY J. Walker   DATE 9/22/03   PROJECT NO. _____
CALCULATIONS CHECKED BY _____   DATE _____   SHEET NO. 1 OF 6
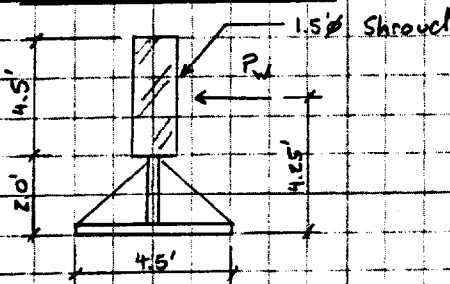SUBJECT Size Antenna Frame Ballast

Calculate Required Antenna Frame Ballast

Find Design Wind Load: [TIA/EIA-222]

$H = 135'$

$$K_h = \left(\frac{135'}{33}\right)^{2/7} = 1.50$$

$V = 65\,mph$

$$q_z = 0.00256(1.5)(65mph)^2 = 27.7\,psf$$

Find Antenna Load:

$$\text{Aspect Ratio} = \frac{4.5'}{1.5} = 3 \quad \therefore \quad C_A = 0.8 \quad [Tbl\ 3]$$

$$G_H = 0.65 + \frac{0.6}{\left(\frac{135'}{33}\right)^{1/7}} = 1.14$$

$$P_W = 27.7psf(1.14)(0.8)[1.5'(4.5')] = 170.5\#$$

$$M_{OT} = 170.5\#(4.25') = 725\#\text{-}ft$$

Calculate Frame Weight:

L4×4 Base	4(4.5')(6.6plf) =	119#
L3×3 Brace	4(3.0')(4.9plf) =	59#
2⅜" Pipe	6.5'(3.65plf) =	24#
C4 Beam	4.5'(5.4plf) =	24#
Antenna	(1) FV65 =	18#
	=	244#

Calculate Req'd Ballast:

$$M_R = 1.5(725\#\text{-}ft) = 1088\#\text{-}ft = (W + 244\#)\left(\frac{4.5'}{2}\right) \Rightarrow \underline{W = 240\#}$$

$$4"×8"×16" \text{ Solid CMU Block} \Rightarrow W = \frac{3\tfrac{5}{8}"(7\tfrac{5}{8}")(15\tfrac{5}{8}")}{12^3}(115pcf) = 28.7\#/block$$

$$\frac{240\#}{28.7\#/block} = 8.4 \qquad \text{Use (9) } 4"×8"×16" \text{ Solid CMU Blocks}$$

Calculate Roof Load:

$$RL = \frac{244\# + 9(28.7\#)}{(4.5')^2} = 25\,psf$$

OEST ASSOCIATES, INC.

PREPARED BY _J. Walker_   DATE _9/15/03_   PROJECT NO. _39053.01_
CALCULATIONS CHECKED BY _____   DATE _____   SHEET NO. _2_ OF _6_
SUBJECT _Check Existing Roof_

Calculate Roof Loads:

Dead ⟹

4" Slab	=	50 psf
Membrane	=	1 psf
Ballast	=	5 psf
Ceiling	=	5 psf
Joists	=	8 psf
Misc	=	9 psf
	=	78 psf

Snow ⟹ $P_f = 0.7(50 psf) = 35 psf$

Drift ⟹ $\gamma_s = 0.13(50 psf) + 14 = 20.5 pcf$

$h_d = 0.43 \sqrt[3]{25'} \sqrt[4]{50 psf + 10} - 1.5 = 2.0'$

$W_d = 4(2.0') = 6.0'$

$P_d = 2.0'(20.5 pcf) = 41 psf$
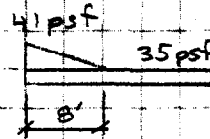
Check Roof Joists:

14" Deep Composit Joists $W_{cap} = 125 psf$ @ 26.25' Spacing   [See Attached Sheet]

$\omega_{TL} = 125 psf (4.1') = 513 plf$ $M = \frac{513 plf (28.25')^2}{8} = 51,176 \text{ #-ft}$

$V = \frac{513 plf (28.25')}{2} = 7,246 \text{ #}$

Estimate @ 17'-2" ⟹ $\omega_M = \frac{8(51,176 \text{ #-ft})}{(17.1')^2} = 1,400 plf$

$\omega_V = \frac{2(7,246 \text{ #})}{17.1'} = 848 plf$ ⟸ Controls

$P_{all} = \frac{848 plf}{4.1'} = 206 psf$

OEST ASSOCIATES, INC.

Check Composite Roof Beam:

$f'_c = 3,000^{PS} \therefore E_c = 3,122^{KS} \& N = 9.3$
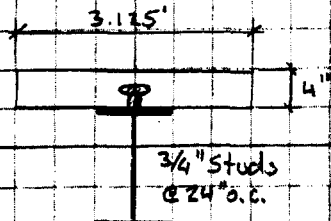
W12×27
$d = 11.96''$
$A = 7.95 \text{in}^2$
$I = 204 \text{in}^4$
$S = 34.2 \text{in}^3$

3/4" Studs @ 24" o.c.

Transformed Width $= \dfrac{3.125'(12)}{9.3} = 4.0''$

Find $\bar{x}$:

$$\bar{x} = \frac{4''(4'')(2'') + 7.95\text{in}^2\left(4'' + \frac{11.96''}{2}\right)}{4''(4'') + 7.95\text{in}^2} = 4.65''$$

Find I Trans.

$$I_{tr} \Rightarrow \text{Slab} = \frac{4'(4'')^3}{12} + 4'(4'')(4.65'' - 2)^2 = 134 \text{in}^4$$

$$\text{Beam} = 204\text{in}^4 + 7.95\text{in}^2\left[\frac{11.96''}{2} - (4.65'' - 4'')\right]^2 = 430 \text{in}^4$$

$$= 564 \text{in}^4$$

Find S Trans:

$$S_{slab} = \frac{564\text{in}^4}{4.65''} = 121 \text{in}^3$$

$$S_{beam} = \frac{564\text{in}^4}{(11.96'' + 4'') - 4.65''} = 49.9 \text{in}^3$$

Find S effective:

$$V_H = \text{Min of} \cdot 0.85(3^{KS})(3.125' \cdot 12)(4'')(0.5) = 191^K$$

$$\cdot 36^{KS}(7.95\text{in}^2)(0.5) = 143^K \quad \Leftarrow \text{Controls}$$

$$V_H' = 6(11.5^K) = 69^K \qquad\qquad [\text{ASDM Tbl I4.1}]$$

$$S_{eff} = 34.2\text{in}^3 + \sqrt{\frac{69^K}{143^K}}(49.9\text{in}^3 - 34.2\text{in}^3) = 45.1 \text{in}^3$$

OEST ASSOCIATES, INC.

PREPARED BY J. Walker   DATE 9/15/03   PROJECT NO. 340.03.01
CALCULATIONS CHECKED BY   DATE _____   SHEET NO. 4 OF 6
SUBJECT Check Existing Roof

Check Composite Roof Beam Con't:

Calculate Live Load Capacity:

Check #1

$$M_{DL} = \frac{78psf(\frac{42'}{2})(25')^2}{8} = 52,406^{\#-ft} \qquad f_{b_{DL}} = \frac{52.4^{k-ft}(12)}{34.2^{ksi}} = 18.4^{ksi}$$

$$f_{b_{LL}} = 0.9(36^{ksi}) - 18.4^{ksi} = 14^{ksi} \qquad M_{LL} = 14^{ksi}(45.1_{in^3}) = 52.6^{k-ft}$$

Check #2:

$$M_{TL} = 0.66(36^{ksi})(45.1_{in^3}) = 89.3^{k-ft} \qquad M_{LL} = 89.3^{k-ft} - 52.4^{k-ft} = 36.9^{k-ft} \Leftarrow Controls$$

Find Live Load:

$$\omega_{LL} = \frac{8(36.9^{k-ft})}{(25')^2} = 472 plf \qquad P_{LL} = \frac{472 plf}{17.2/2} = 55 psf$$

Check Roof Load:

Note: Roof Ballast Will be Removed Under Antenna Frame ∴ $P_a = 25psf - 5psf = 20 psf$

Roof Reserve = $55psf - 35psf = 20 psf \approx P_a = 20psf$ (OK)

OEST ASSOCIATES, INC.

PREPARED BY J. Walker   DATE 9/15/03   PROJECT NO. 390.03.01
CALCULATIONS CHECKED BY   DATE   SHEET NO. 5 OF 6
SUBJECT Check Existing Penthouse Roof

<u>Check Penthouse Roof Joists</u>

$V_{max} = 7,246^{\#}$ [See page #2]

<u>Estimate Capacity @ 21.5'</u> $\omega_v = \dfrac{2(7,246^{\#})}{21.5'} = 674 \, plf$

$P_{all} = \dfrac{674 \, plf}{4.25''} = \underline{159 \, psf}$

<u>Check Penthouse Roof Beam</u>

$W14 \times 30 \Rightarrow M_{cap} = 0.66(36^{ksi})(41.9 in^3) = 83.0^{k-ft}$

$\omega_{cap} = \dfrac{8(83.0^{k-ft})}{(23')^2} = 1,255 \, plf$

$P_{cap} = \dfrac{1,255 \, plf}{21.5'/_2} = \underline{117 \, psf}$ ⟸ Controls Roof

<u>Estimate Penthouse Roof Weight:</u>

3" Slab	= 38 psf
Membrane	= 1 psf
Ballast	= 5 psf
Ceiling	= 5 psf
Joists	= 8 psf
Misc	= 5 psf
	= 62 psf

<u>Check Roof Load:</u>

Note: Roof Ballast will be removed under Antenna Frame ∴ $P_a = 25 psf - 5psf = 20 psf$

Roof Reserve = $117 psf - 62 psf - 35 psf = \underline{20 psf} \approx P_a = 20 psf$ (OK)

Design Equipment Platform:
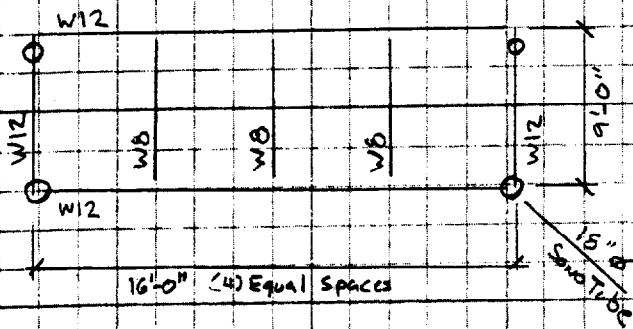
Design Loads:

$DL = 10\,psf$

$Equip = 2,400\# @ 30" \times 42" = 275\,psf$

$Live = 40\,psf$

Grating $\Rightarrow$ Use $1\frac{1}{4}" \times \frac{3}{16}"$ Steel Bearing Bars @ $1\frac{3}{16}"$ o.c. $W_{cap} = 370\,psf$

W8 $\Rightarrow$ $L = 9'$ $W = DL = 10\,psf\,(4.0') = 40\,plf$

$= LL = 275\,psf\,(\ ") = 1,100\,plf$

Try W6×10 $M = \dfrac{1,140\,plf\,(9')^2}{8} = 11,543\,\#\text{-}ft$ $f_b = \dfrac{11.5^{k\text{-}ft}(12)}{7.81\,in^3} = 17.7^{ksi}$ (OK)

$V = \dfrac{1,140\,plf\,(9')}{2} = 5,130\,\#\text{-}ft$ $f_v = \dfrac{5.1^k}{7.89"(0.17")} = 3.8^{ksi}$ (OK)

W12 $\Rightarrow$ $L = 16'$ $W = DL = 10\,psf\,(4\frac{1}{2}) = 45\,plf$

$= LL = 275\,psf\,(\ ") = 1,238\,plf$

Try W12×19 $M = \dfrac{1,283\,plf\,(16')^2}{8} = 41,056\,\#\text{-}ft$ $f_b = \dfrac{41.1^{k\text{-}ft}(12)}{21.3\,in^3} = 23.2^{ksi}$ (OK)

$V = \dfrac{1,283\,plf\,(16')}{2} = 10,264\,\#$ $f_v = \dfrac{10.3^k}{12.16(0.235")} = 3.6^{ksi}$ (OK)

SonoTube $\Rightarrow$ $P = DL = 100\,psf\,(4\frac{1}{2})(16\frac{1}{2}) = 360\#$

$= 1.76\,ft^2(8')(150\,pcf) = 2,112\#$

$= LL = \frac{1}{2}(3)(2,400\#) = 3,600\#$

$= 6,072\#$

$F_p = \dfrac{6,072\#}{1.76\,ft^2} = 3,450\,psf$ $\Leftarrow$ __Add (2) More Tubes to Control Settlement__

EMS
Wireless

FR65-17-XXDP

DualPol® Polarization
1850 MHz - 1990 MHz

OptiFill™

Electrical Specifications

Azimuth Beamwidth	65°
Elevation Beamwidth	7°
Gain	16.5 dBi (14.4 dBd)
Polarization	Dual Linear Slant (± 45°)
Port-to-Port Isolation	≥ 30 dB
Front-to-Back Ratio	≥ 30 dB
Electrical Downtilt Options	0°, 2°, 4°
VSWR	1.35:1 Max
Connectors	2; 7-16 DIN (female)
Power Handling	250 Watts CW
Passive Intermodulation	≤ -150 dBc
	[2 x 20 W (+ 43 dBm)]
Lightning Protection	Chassis Ground

2.75"   8"

56"

42"

RF
CONNECTORS

Mechanical Specifications
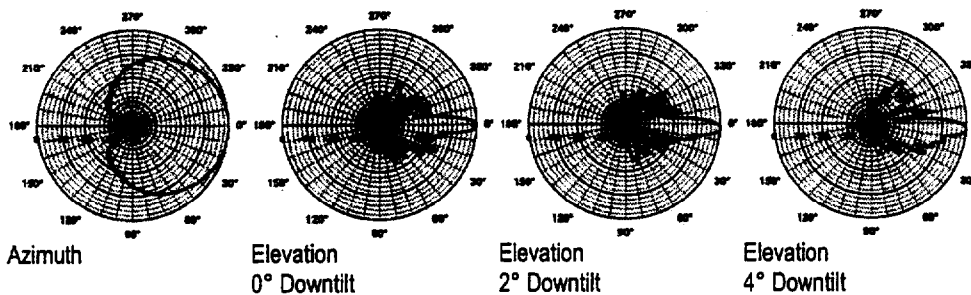
Dimensions (L x W x D)	56 in x 8 in x 2.75 in
	(142 cm x 20.3 cm x 7.0 cm)
Rated Wind Velocity	150 mph (241 km/hr)
Equivalent Flat Plate Area	3.1ft² (.29 m²)
Front Wind Load @ 100 mph (161 kph)	90 lbs (400 N)
Side Wind Load @ 100 mph (161 kph)	31 lbs (139 N)
Weight	18 lbs (8.2 kg)

Mounting Options

MTG-P00-10, MTG-S02-10, MTG-DXX-20*, MTG-CXX-10*, MTG-C02-10, MTG-TXX-10*

*Note: *Model number shown represents a series of products. See Mounting Options section for specific model number.*
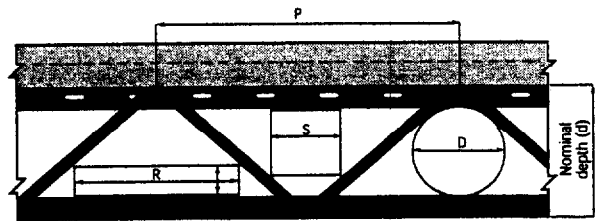
Patterns

| Azimuth | Elevation 0° Downtilt | Elevation 2° Downtilt | Elevation 4° Downtilt |

Revised 04/05/02

Maximum Clear Spans

8"	23'-2"	22'-8"	22'-4"	21'-2"	20'-10"
10"	26'-4"	25'-1"	25'-1"	24'-0"	23'-4"
12"	29'-8"	27'-10"	27'-10"	26'-6"	25'-11"
14"	32'-6"	30'-4"	30'-4"	28'-10"	28'-3"
16"	35'-2"	33'-0"	33'-0"	31'-2"	30'-4"
18"	37'-9"	35'-4"	35'-4"	33'-5"	32'-7"
20"	40'-4"	37'-7"	37'-7"	35'-6"	34'-6"
22"	42'-8"	39'-11"	39'-11"	37'-7"	36'-6"
24"	45'-2"	42'-0"	42'-0"	39'-6"	38'-5"

*Note: Total floor depth = hambro® depth plus slab thickness loads
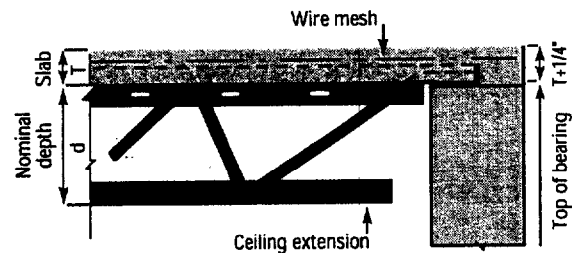Loads are psf.

Maximum Web Opening

d	P	D	S	R
8"	17"	4"	4"	6" X 3"
10"	18"	6"	5"	6" X 4"
12"	19"	7 1/2"	6"	6" X 4"
14"	21"	9"	6"	8" X 4"
16"	22"	10"	7"	10" X 4"
18"	24"	11"	8"	10" X 6"
20"	24"	12"	9"	12" X 6"
22"	24"	12"	9"	12" X 6"
24"	24"	13"	10"	12" X 6"

Standard Shoe*

Top chord
Top of slab
1 1/2" 1" min.
1 3/4"
1/4"
Bearing
4
Underside of slab
End diagonal

Typical Bearing Detail

Wire mesh
Slab
T
T+1/4"
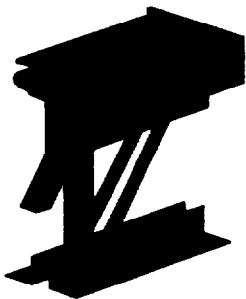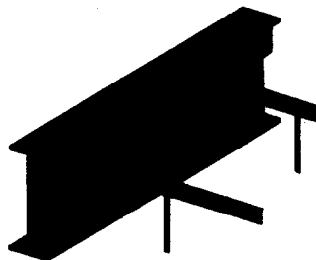Nominal depth
d
Top of bearing
Ceiling extension

*All dimensions are approximate

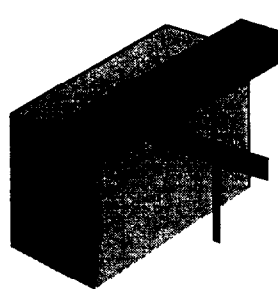## Additional Systems and Accessories

LH Series
This series features a top chord "S" made of two hambro® sections.
Hambro® composite long span floors provide greater economy for heavy service loads and longer spans. Joist depths range from 20" to 48" with spans up to 65'. Details are available from your hambro® representative.
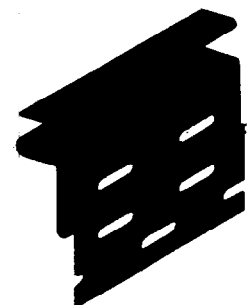
Rollbar Angle (RA) on Steel Beam
This hambro® accessory is designed to be field attached to the top flange of a steel beam running parallel to a hambro® joist. Rollbar Angle (RA) is slotted similar to the hambro® top chord "S" to accommodate ROLLBARS® .

RA on Walls
This hambro® accessory is fastened at the top of walls and is slotted similar to the hambro® top chord "S" to accommodate ROLLBARS® .
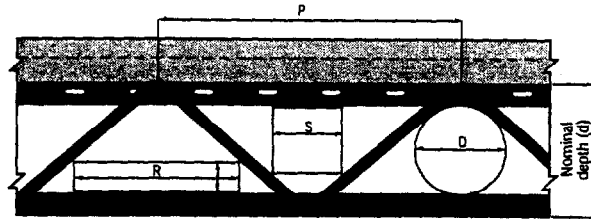
Hanger Plate
Shop attached slotted plate for thicken slab areas.

Maximum Clear Spans

8"	23'-2"	22'-8"	22'-4"	21'-2"	20'-10"
10"	26'-4"	25'-1"	25'-1"	24'-0"	23'-4"
12"	29'-8"	27'-10"	27'-10"	26'-6"	25'-11"
14"	32'-6"	30'-4"	30'-4"	28'-10"	28'-3"
16"	35'-2"	33'-0"	33'-0"	31'-2"	30'-4"
18"	37'-9"	35'-4"	35'-4"	33'-5"	32'-7"
20"	40'-4"	37'-7"	37'-7"	35'-6"	34'-6"
22"	42'-8"	39'-11"	39'-11"	37'-7"	36'-6"
24"	45'-2"	42'-0"	42'-0"	39'-6"	38'-5"

*Note: Total floor depth = hambro® depth plus slab thickness loads
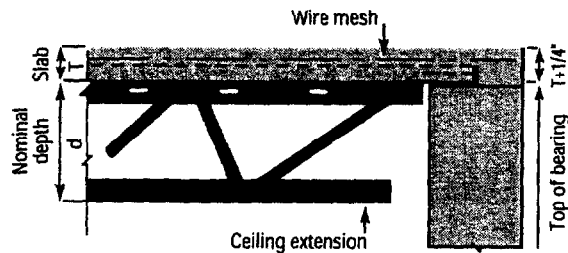   Loads are psf.

Maximum Web Opening

d	P	D	S	R
8"	17"	4"	4"	6 X 3
10"	18"	6"	5"	6 X 4
12"	19"	7 1/2"	5"	6 X 4
14"	21"	8"	6"	8 X 4
16"	24"	10"	7"	10 X 4
18"	24"	11"	8"	10 X 6
20"	24"	12"	9"	12 X 6
22"	24"	12"	9"	12 X 6
24"	24"	13"	10"	12 X 6

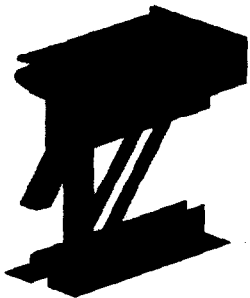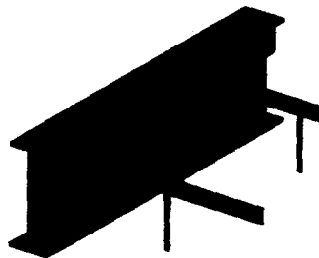## Standard Shoe*

Typical Bearing Detail

*All dimensions are approximate

Additional Systems and Accessories

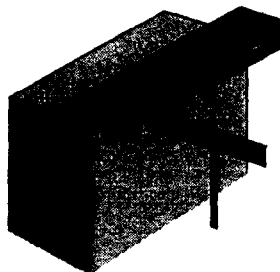### Series
s series features a top chord "S" made
wo hambro' sections.
nbro' composite long span floors
vide greater economy for heavy service
is and longer spans. Joist depths range
n 20" to 48" with spans up to 65'.
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Rollbar Angle (RA) on Steel Beam
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Rollbar Angle (RA) is slotted similar to the
hambro' top chord "S" to accommodate
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RA on Walls
This hambro' accessory is fastened at
the top of walls and is slotted similar to the
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ROLLBARS'.

Hanger Plate
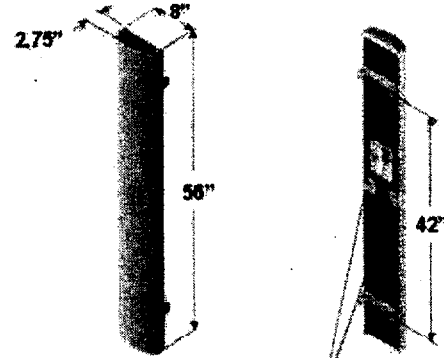Shop attached slotted plate for thicken
slab areas.

EMS
Wireless

FR65-17-XXDP

DualPol® Polarization

1850 MHz - 1990 MHz

OptiFill™

Electrical Specifications

Azimuth Beamwidth	65°
Elevation Beamwidth	7°
Gain	16.5 dBi (14.4 dBd)
Polarization	Dual Linear Slant (± 45°)
Port-to-Port Isolation	≥ 30 dB
Front-to-Back Ratio	≥ 30 dB
Electrical Downtilt Options	0°, 2°, 4°
VSWR	1.35:1 Max
Connectors	2; 7-16 DIN (female)
Power Handling	250 Watts CW
Passive Intermodulation	≤ -150 dBc
	[2 x 20 W (+ 43 dBm)]
Lightning Protection	Chassis Ground

RF CONNECTORS

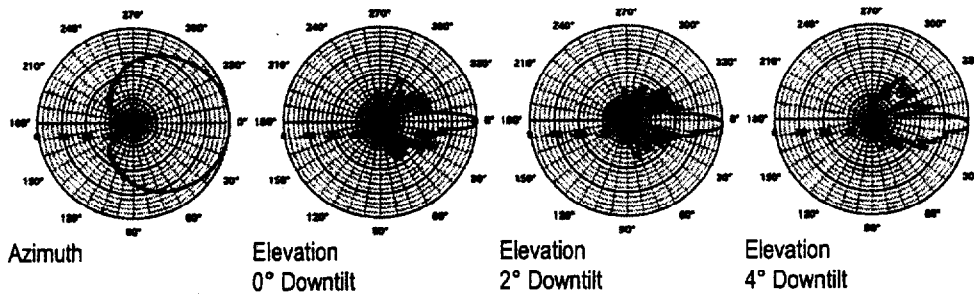## Mechanical Specifications

Dimensions (L x W x D)	56 in x 8 in x 2.75 in
	(142 cm x 20.3 cm x 7.0 cm)
Rated Wind Velocity	150 mph (241 km/hr)
Equivalent Flat Plate Area	3.1ft² (.29 m²)
Front Wind Load @ 100 mph (161 kph)	90 lbs (400 N)
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Weight	18 lbs (8.2 kg)

Mounting Options

MTG-P00-10, MTG-S02-10, MTG-DXX-20*, MTG-CXX-10*, MTG-C02-10, MTG-TXX-10*

*Note: *Model number shown represents a series of products. See Mounting Options section for specific model number.*
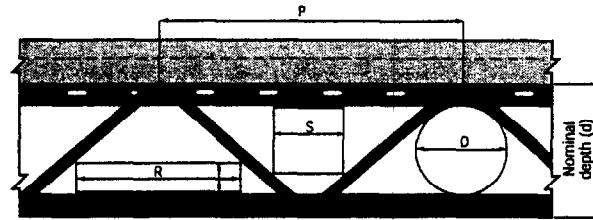
Patterns

Azimuth	Elevation 0° Downtilt	Elevation 2° Downtilt	Elevation 4° Downtilt

Revised 04/05/02

Maximum Clear Spans

8"	23'-2"	22'-8"	22'-4"	21'-2"	20'-10"
10"	26'-4"	25'-1"	25'-1"	24'-0"	23'-4"
12"	29'-8"	27'-10"	27'-10"	26'-6"	25'-11"
14"	32'-6"	30'-4"	30'-4"	28'-10"	28'-3"
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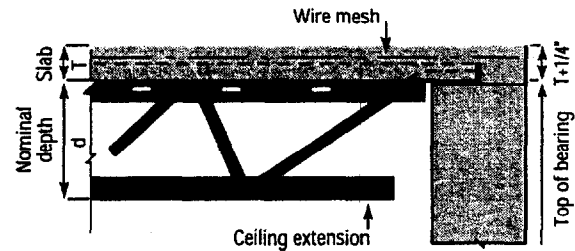Loads are psf.

Maximum Web Opening

d	P	D	S	R
8"	17"	4"	4"	6" X 3"
10"	18"	6"	5"	6" X 4"
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14"	21"	8"	6"	8" X 4"
16"	24"	10"	8"	10" X 4"
18"	24"	11"	8"	10" X 6"
20"	24"	12"	9"	12" X 6"
22"	24"	12"	9"	12" X 6"
24"	24"	13"	10"	12" X 6"

Standard Shoe*

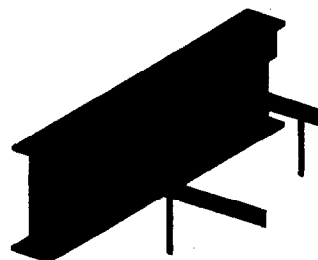

Typical Bearing Detail

*All dimensions are approximate
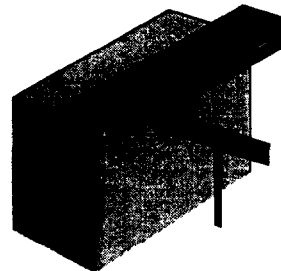
Additional Systems and Accessories

LH Series
This series features a top chord "S" made of two hambro* sections.
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Rollbar Angle (RA) on Steel Beam
This hambro* accessory is designed to be field attached to the top flange of a steel beam running parallel to a hambro* joist. Rollbar Angle (RA) is slotted similar to the hambro* top chord "S" to accommodate ROLLBARS* .
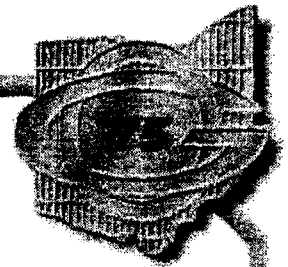
RA on Walls
This hambro* accessory is fastened at the top of walls and is slotted similar to the hambro* top chord "S" to accommodate ROLLBARS* .

Hanger Plate
Shop attached slotted plate for thicken slab areas.

Ohio Gratings is a major stocking and fabricating distributor of electroforge welded carbon steel bar grating. Bearing bars range from 3/4" x 3/16" through 2 1/2" x 3/16" in 1/4" increments. Bearing bar spacings of 1 3/16", 15/16" and 11/16" are available with cross rods on 4" or 2" centers. The bearing bar surface may be provided plain, or with serrations for maximum skid resistance.

Electroforge welded steel grating is ideal for pedestrian traffic, and for light, rubber pneumatic tired rolling traffic (carts, dollies and hand trucks). For other rolling loads (forklifts, cars, trucks, etc.) see the Heavy Duty Steel Grating section, page 47.

How to Specify:

1. Grating: Light Duty Welded Steel W Series by Ohio Gratings, Inc., or approved equal.
2. Bearing Bars: Rectangular Bar on 1 3/16" centers maximum. (Note: Other spacings may be specified at the discretion of the architect/engineer.)
3. Cross Bars: Electroforge welded at right angles to bearing bars at 4" centers maximum. (Note: 2" cross bar centers may be specified at the discretion of the architect/engineer.)
4. Surface: Plain. (Note: A serrated surface may be specified for maximum skid resistance.)
5. Loading: Grating to carry a pedestrian loading equal to 100# per square foot over the required clear span with deflection not to exceed 1/4". (Note: Alternate loading requirements may be specified at the discretion of the architect/engineer.)
6. Finish: (Galvanized or manufacturer's standard black paint at the discretion of the architect/engineer.)
7. Fabrication and Tolerances: In accordance with the NAAMM Metal Bar Grating Manual.

Plain Surface

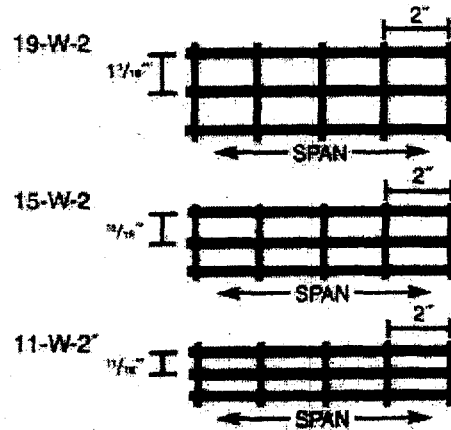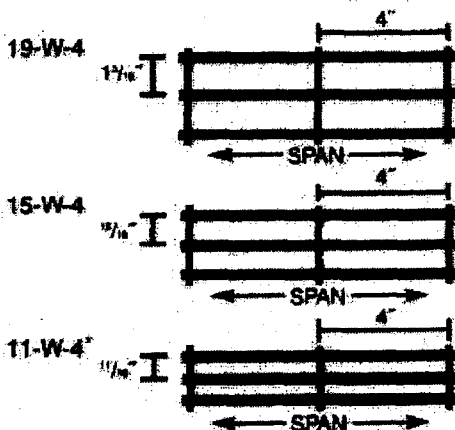**Serrated Surface**
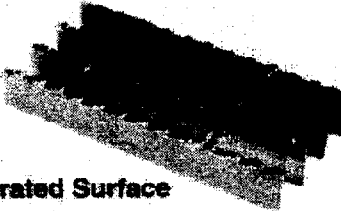
Stainless Steel
(Shown for comparison only;
not available from Ohio Gratings)

For those areas requiring the corrosion resistance of stainless steel, Ohio Gratings stocks 1" x 3/16", 1 1/4" x 3/16" and 1 1/2" x 3/16" 19-SGSS-4 Type 304 Swaged Stainless Steel grating (see page 93). Swaged Stainless eliminates the warping, twisting and discoloration inherent in the electroforging process, and provides an excellent choice for those severe industrial corrosion applications. The SGSS Series is also available in ADA (July 1991) compliant spacings.

Note: For complete CSI Three-Part Section Format guide specification information, refer to page 113.

Grating Types - Light Duty Welded Steel W Series

19-W-4   4"
1 3/16"
← SPAN →

15-W-4   4"
15/16"
← SPAN →

11-W-4*   4"
11/16"
← SPAN →

19-W-2   2"
1 3/16"
← SPAN →

15-W-2   2"
15/16"
← SPAN →

11-W-2*   2"
11/16"
← SPAN →

*Note: Conforms with the spacing requirements of ADA (July 1991) when installed with the elongated opening perpendicular to the dominant direction of travel. See Inside Front Cover for further information.

LIGHT DUTY WELDED STEEL
19-W-4/19-W-2
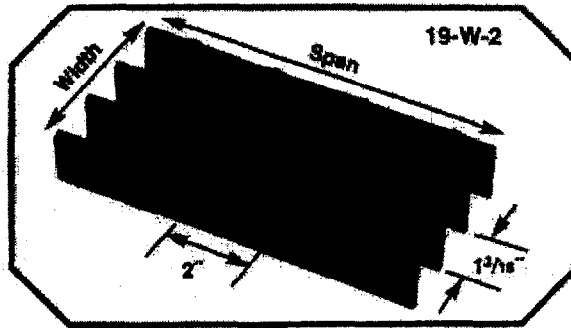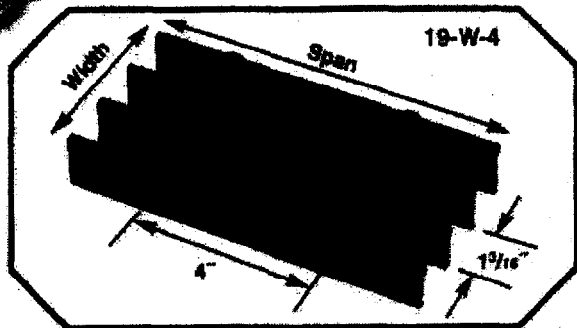
19-W-4

19-W-2

Load Table 19-W-4/19-W-2

Bar Size, Inches	Ped Span, Inches	Wt. Lbs. Sq. Ft.	Sec. Prop Sx², In³ Ix², In⁴		2'-0"	2'-6"	3'-0"	3'-6"	4'-0"	4'-6"	5'-0"	5'-6"	6'-0"	6'-6"	7'-0"	8'-0"
³/₄ × ³/₁₆	46	5.67	0.175	U	533	341	237	174	133							
				D	0.099	0.155	0.224	0.304	0.397							
			0.067	C	533	426	356	305	266							
				D	0.079	0.124	0.179	0.244	0.317							
1 × ³/₈	61	6.15	0.211	U												
			0.106													
1 × ³/₁₆	57	7.35	0.316	U	947	656	431	308	237	187	152					
				D	0.074	0.116	0.166	0.226	0.296	0.377	0.467					
			0.156	C	947	758	632	541	474	421	379					
				D	0.060	0.093	0.134	0.182	0.238	0.302	0.372					
1¼ × ³/₁₆	67	9.03	0.493	U	1480	947	658	483	370	292	237	196	164			
				D	0.060	0.093	0.134	0.182	0.236	0.301	0.373	0.451	0.535			
			0.308	C	1480	1184	987	846	740	656	592	538	493			
				D	0.048	0.074	0.107	0.146	0.191	0.241	0.298	0.360	0.428			
1½ × ³/₁₆	77	10.94	0.711	U	2132	1364	947	696	533	421	341	282	237	202		
				D	0.050	0.078	0.112	0.152	0.199	0.251	0.310	0.376	0.447	0.525		
			0.533	C	2132	1706	1421	1218	1066	947	853	775	711	656		
				D	0.040	0.062	0.090	0.122	0.159	0.201	0.248	0.300	0.358	0.420		
1¾ × ³/₁₆	87	12.62	0.967	U											277	241
2 × ³/₁₆	96	14.30	1.263	U	3788	2425	1684	1237	947	748	608	501	421	358	309	237
				D	0.037	0.058	0.084	0.114	0.149	0.189	0.233	0.282	0.335	0.394	0.456	0.596
			1.263	C	3788	3032	2526	2166	1895	1684	1516	1378	1263	1166	1083	947
				D	0.030	0.047	0.067	0.091	0.119	0.151	0.186	0.225	0.268	0.315	0.365	0.477
2¼ × ³/₁₆	104	15.97	1.598													
			1.756													
2½ × ³/₁₆	113	17.55	1.974	U	5921	3788	2632	1933	1480	1170	947	783	658	561	483	370
				D	0.030	0.047	0.067	0.091	0.119	0.151	0.186	0.225	0.268	0.315	0.365	0.477
			2.467	C	5921	4737	3947	3383	2960	2632	2368	2153	1974	1822	1692	1480
				D	0.024	0.037	0.054	0.073	0.095	0.121	0.149	0.180	0.215	0.252	0.292	0.381

U - Safe uniform load in pounds/sq. ft.
C - Safe concentrated load in pounds/ft. grating width.
D - Deflection in inches

Loads and deflections given in this table are theoretical, and are based on a unit stress of 18,000 psi.

% Open Area*		
Bars	¹/₈"	³/₁₆"
4" cc	83%	77%
2" cc	78%	71%

*Based on 10.105 bars/ft. of grating width. Bearing bars 1³/₁₆" c.c. Add .8 lbs./sq. ft. for 19-W-2.

Note: Grating for spans to the left of the heavy line have a deflection less than ¹/₄" for uniform loads of 100 lbs./sq. ft. This is the maximum deflection to afford pedestrian comfort and can be exceeded for other types of load at the discretion of the engineer. The actual Ped (pedestrian) Span under this condition is shown above for each size of grating. When serrated grating is specified, the depth of grating required for a specific load will be ¹/₄" greater than that shown in these tables.

19-W-4/19-W-2 Panel Width Chart (in.)   Dimensions Are Out-to-Out of Bearing Bars**

No. of Bars	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
³/₁₆" Bars	1⁷/₈	2⁹/₁₆	3³/₈	4¹⁵/₁₆	6¹/₈	7⁵/₁₆	8½	9¹¹/₁₆	10⁷/₈	12¹/₁₆	13¼	14⁷/₁₆	15⁵/₈	16¹³/₁₆	18
No. of Bars	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
³/₁₆" Bars	19³/₁₆	20³/₈	21⁹/₁₆	22³/₄	23¹⁵/₁₆	25¹/₈	26⁵/₁₆	27½	28¹¹/₁₆	29⁷/₈	31¹/₁₆	32¼	33⁷/₁₆	34⁵/₈	35¹³/₁₆

**Deduct ¹/₁₆" for ¹/₈" bearing bars. Standard panel widths indicated in blue.